
Granite Outcrop Vegetation in Alabama

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In various parts of the world, particularly in the southeastern United States, there are numerous approximately level areas of bare rock of several kinds, with interesting vegetation in crevices, pockets, etc., usually quite different from that growing on cliffs and stream-beds of the same sort of rock.¹ Flat rock vegetation is usually exposed to the sun and wind most of the day, while cliffs may be shaded most of the time, if they face away from the equator or have trees growing in front of them. And flat rocks may not have as complete protection from fire and grazing animals as cliffs do.

Although granite is one of the commonest of rocks, flat or gently sloping outcrops of it are less frequent than cliffs and boulders, in the eastern United States at least. But such exposures (including gneiss, which is very similar chemically) are scattered through the Piedmont region from North Carolina² to eastern Alabama, with isolated areas in Arkansas³ and Texas.⁴ They are

¹For a sketch of several types of flat rock vegetation, with special reference to the cedar glades of Tennessee, see *Ecology* 7: 48-54, pl. 1. 1926. Another type, investigated later, that has some of the characteristics of flat rock vegetation, is described in *Torreyia* 29: 127-130. 1929.

²For descriptions of granite outcrops in western North Carolina, intermediate in character between flat rocks and cliffs, see H. D. House, *Torreyia* 10: 29-34. February, 1910; Oosting & Anderson, *Ecology* 18: 280-292. April, 1937. The two authors last named have since published a very detailed description of granite outcrop vegetation in east-central North Carolina. (*Bot. Gaz.* 100: 750-768, figs. 1-9. June, 1939.) There is no indication of just where or when the photographs were taken (possibly for protection against botanical vandals), but the vegetation is very similar to that here described, even to the weeds.

³See *Ecology* 7: 54. 1926.

⁴See Eula Whitehouse, *Ecology* 14: 391-405. 1933. This contains among other things a list of over 200 species of plants, arranged alphabetically in each subkingdom, with no indication of relative abundance, and no distinction between natives and weeds. About 15 percent of the flowering plants listed appear to be weeds.

probably most extensive in Georgia, particularly in the vicinity of Stone Mountain.

About 39 years ago⁵ I listed the plants I had observed on flat granite or gneiss rocks around Athens, Georgia, from memory, in taxonomic order, and including a few weeds. The following year⁶ I made a few additions to the list, from other similar localities in the same state. No list of granite outcrop plants for the whole state of Georgia seems to have been attempted yet, but Rogers McVaugh and others have recently published some interesting notes on particular species of such habitats.⁷

The known outcrops of granite in Alabama are very limited in extent, their aggregate area probably not exceeding one or two square miles; and most of them are in one county, Randolph, which borders on Georgia. They were rather remote from railroads and, therefore, inaccessible, in Dr. Charles Mohr's lifetime, and there is no mention of them in his great work, the *Plant Life of Alabama*, published in 1901.⁸

A soil map of Randolph County, published by the U. S. Bureau of Soils in 1912, shows the location of a few of the larger granite outcrops in the county, and they are described briefly in the text accompanying it.

Although I had been in all the Piedmont counties of Alabama as early as 1906, and in most of them several times, and had seen a few granite boulders, I had no acquaintance with the typical flat rocks in the state until 1936. In June of that year, while on a camping trip with a party of geologists and zoologists, I

⁵ Bull. Torrey Bot. Club 27: 328, 1900.

⁶ Ibid. 28: 461-462, 469, 473, 1901.

⁷ *Castanea* (Jour. So. Appal. Bot. Club) 2: 58-60, 100-105 (three articles), 1937; Bull. Torrey Bot. Club 66: 411-415, June, 1939. (The third of these articles, on *Amphianthus*, was badly mixed by the printers, but straightened out in the reprints distributed by the author.)

⁸ The large granite area around Almond (then called Flatrock) was mentioned briefly in the "Report of Progress" of Dr. Eugene A. Smith, state geologist, for 1874 (page 56), but he said nothing about its vegetation, though he was well versed in floristic botany, and about the same time collected many plants around Tuscaloosa, which were cited by Dr. Mohr. Dr. Smith's field notes show that he visited that and other granite exposures in the same county again in the '90s; but he missed the opportunity to add several species to the known flora of the state, probably indicating that he carried no plant collecting equipment on most of his geological field trips.

found an acre or less of granite or gneiss, partly flat and partly steeply sloping, near the Coosa River in Chilton County. A few days later, walking up the Tallapoosa River from Wadley, in Randolph County, along a railroad which skirts the river for several miles, I found a still smaller area of the same rock, too small to show on the soil map, with a few of the characteristic plants.



View on the granite outcrop near Blake's Ferry, showing bare rock in the foreground, a clump of stunted cedars at left of center, and *Nyssa sylvatica* at extreme left. June 8, 1939.

My first opportunity to visit any of the large outcrops in that county came on August 3, 1938, when I was on a botanical trip with Dr. H. K. Svenson, he kindly furnishing automobile transportation. Earlier in the day we had visited the Chilton County outcrop, and we were trying to find additional localities for some of the characteristic plants occurring there. Around the village of Almond, about three miles northwest of Wadley, we found many acres of exposed granite, some domelike and some nearly flat, which Dr. Smith had visited in 1874 and the soil surveyors in 1911. It was late in the afternoon when we reached the place, and we were still about fifty miles from where we had planned to spend the night, but I made what notes I could and collected a few specimens.

The soil map shows a still larger rock outcrop a little west of Blake's Ferry on the Tallapoosa River, about ten miles north of

Almond (visited by Dr. Smith on August 31, 1896, about a month after he had been on Cheaha Mountain with Dr. Mohr). Dr. Svenson and I did not have time to visit it last year, but Dr. McVaugh, at my suggestion, went there early in March this year, and in spite of the early date found there among other things *Isoetes melanospora* and *Amphianthus pusillus*, two species not known outside of Georgia before. I visited the same place on June 8th, walking from Lineville, a railroad station about nine miles away, and got many notes and a few specimens and photographs.

The next day I went by automobile with a friend who lives near the northwest corner of Randolph County, to look for a rocky area indicated on the soil map, near the Tallapoosa River and close to the northern edge of the county. On inquiring of people living in the neighborhood we were directed to the site of a Flat Rock Church, which had burned down last year, in the edge of a cut-over woodland. At the site the reason for the name was not apparent, for there was no rock in evidence, except fragments scattered over the surface, as is usual in hilly regions. But I thought I might as well make some notes of what vegetation was in sight, so as to have something to show for the trip, and we struck out at random on a little-used road through the woods. And in a quarter of a mile or so we came to a sloping area of gneiss, perhaps not more than 25 feet wide and 75 feet long, with more *Talinum Mengesii* than I had ever seen in a similar area before, and a few other characteristic plants, but a surprising number of weeds, though the place was not close to any house or field.

It is perhaps hardly necessary to remark that on all flat rocks, whether granite or other, there is a considerable diversity of plant associations, which could be treated separately in a very detailed study. The smoothest areas may have no vegetation visible to the naked eye, or a sparse covering of crustose lichens, or small mosses. Cracks and crevices give larger plants a foothold, and there are often shallow depressions produced by weathering. Some of these hold water long enough to support aquatic or semi-aquatic plants like *Isoetes* and *Amphianthus*, while others are dry most of the time, and occupied principally by such little plants as *Diamorpha*. Soil tends to accumulate in the pools and pockets, and around the edges of the rocks where it disappears beneath the surface; and

where there is enough of it it supports copses of shrubs and trees. At the upper edge of a sloping rock outcrop, and at various other places where the surface is irregular, there may be a gentle seepage of water, giving rise to bog conditions.

In the following plant list all these minor habitats are combined, but only such trees and shrubs are included as occur in "island" copses, and not those in the bordering forests. My notes are not complete enough yet to warrant going into finer details, as Miss Whitehouse did in her Texas granite study already cited and Oosting and Anderson in their paper on east-central North Carolina. But as usual I have separated trees, shrubs, herbs, etc., and then arranged the species in approximate order of abundance in each group. Evergreens are indicated by heavy type. Weeds, presumably brought in by cattle, sightseers, picnickers, etc., are omitted for the present, though of course it is not always possible to draw a sharp line between weeds and natives. Among the common weeds of such places, some of which may possibly be indigenous, are *Sarothra gentianoides*, *Diodia teres*, *Senecio Smallii*, and *Ambrosia elatior*.

This list is made up from observations in Randolph County only. The Chilton County locality previously mentioned (visited in June, 1936, May, 1937, and August, 1938) is omitted to avoid complications, because it is somewhat different in character, but some of its interesting plants may as well be noted in passing. *Cheilanthes tomentosa* occurs there under ledges, *Arenaria patula*, *Delphinium carolinianum* and *Talinum parviflorum* on gentler slopes, and *Rhapidophyllum* at the base of a cliff.⁹ Some of these plants are often found on limestone, and it may be that the gneiss at that point is more calcareous than usual.

Visits to the rocks in Randolph County and elsewhere in spring and fall would doubtless reveal additional species, that are not readily recognizable in summer, and make more certain the identification of some that I could only guess at when flowers were not available, and thus eliminate some of the interrogation points in the list. But such an opportunity cannot be counted on in the

⁹ See Castanea, 3: 24. (March) 1938. Since the above was written W. Wolf has described the Chilton County *Talinum* as a new species, *T. appalachianum*, in the American Midland Naturalist for September, 1939. All or nearly all the known stations for *T. parviflorum* are west of the Mississippi river.

immediate future, and many other problems are pressing; so it seems desirable to put on record now some of the discoveries already made. Most species seen only once are omitted, for there is a greater possibility of mistaken identification with them than with the commoner ones, and they may not mean much anyway.

The list follows:

	TREES
Juniperus virginiana	<i>Quercus marylandica</i>
<i>Quercus stellata</i>	Pinus echinata
Pinus taeda	<i>Nyssa sylvatica</i>
	SHRUBS
<i>Callicarpa americana</i>	Batodendrum arboreum
<i>Rhus copallina</i>	<i>Chionanthus virginica</i>
	VINES
Gelsemium sempervirens	<i>Parthenocissus quinquefolia</i>
Bignonia crucigera	
	HERBS
<i>Juncus georgianus</i>	<i>Laciniaria microcephala</i>
Opuntia (perhaps two species)	<i>Commelina saxicola?</i>
<i>Talinum Mengesii</i>	<i>Manfreda virginica</i>
<i>Tradescantia reflexa?</i>	<i>Agalinis tenuifolia?</i>
<i>Crotonopsis linearis?</i>	<i>Ilysanthes refracta?</i>
<i>Kneiffia subglobosa?</i>	Cheilanthes lanosa
<i>Polygala Curtissii</i>	<i>Andropogon</i> sp
<i>Arenaria bevilofia</i>	Yucca filamentosa
<i>Danthonia sericea</i>	<i>Lespedeza virginica?</i>
<i>Fimbristylis autumnalis</i>	<i>Viguiera (Gymnolomia) Porteri</i>
<i>Cyperus inflexus</i> ¹⁰	<i>Stenophyllus capillaris</i>
<i>Senecio tomentosus</i>	<i>Lechea</i> sp.
<i>Helianthus longifolius?</i>	<i>Silene virginica</i>
	MOSSES, ETC.
Grimmia leucophaea	Usnea sp. (on <i>Juniperus</i>)
Cladonia sps.	Polytrichum commune?
(and several other mosses and lichens).	

This list of course has much in common with my Georgia list of 1900, and some of the others referred to above, but it is too incomplete to warrant any close comparisons, or statistical studies yet. *Juncus georgianus*, *Senecio tomentosus*, and *Viguiera Porteri*,

¹⁰ This may be referable to McVaugh's *C. granitophilus* (*Castanea* 2: 100-104. 1937), if that is a distinct species.

which are common on or around Stone Mountain (as are *Isoetes melanospora* and *Amphianthus*, mentioned in an earlier paragraph), seem to be here reported from Alabama for the first time. On the other hand, *Talinum Mengesii* seems to have its center of distribution in Alabama (where it grows also on sandstone).¹¹

It is one of the great mysteries of nature how the species known only on rock outcrops, most of them with no known means of dissemination (except that wind might blow their seeds a few feet or yards) could have found their way to isolated localities many miles from other similar habitats. But time is long, and presumably in thousands of years several kinds of exceptional opportunities that we have little conception of could occur once or twice. Possibly tornadoes have been a factor in transporting small smooth seeds that are not particularly adapted for wind dispersal.

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Lucy Millington

LIBERTY H. BAILEY

To the new country in southwestern Michigan in which I was born and reared came Lucy A. Millington in the spring of 1876. It was reported she was a botanist, and this aroused my curiosity. Long before that time I had borrowed a copy of Gray's *Field, Forest and Garden Botany*, which I had studied by myself in winter and the identical copy of which I still possess, and I had waited for the first crocus to make the book real. I began an herbarium. I had never seen a botanist except that Dr. W. J. Beal had come to our village to lecture. Would I now have someone to share my joy and to guide me through the difficult parts of the book?

The Millingtons settled beyond "Dyckman's Woods" and thus I would have additional reason to pass often through that enchanted place. Dyckman's Woods had not long been cut from the

¹¹ Dr. McVaugh writes me that he has found it in a few places in Georgia, where it is less common than *T. teretifolium*, which is not definitely known from Alabama, all the specimens hitherto referred to it in this state turning out to be *T. Mengesii*, according to Wolf's recent study referred to above.